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THE USE OF SCAFFOLDING-BASED SOFTWARE IN DEVELOPING PRONUNCIATION

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THE USE OF SCAFFOLDING-BASED SOFTWARE IN DEVELOPING PRONUNCIATION

By

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DEDICATION

To the wind beneath my wings

Abstract of thesis presented to the Senate of Universiti Putra Malaysia
in fulfilment of the requirement for the degree of Master of Arts

THE USE OF SCAFFOLDING-BASED SOFTWARE IN DEVELOPING PRONUNCIATION

By

ANAHITA FARZANFAR

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Chairman: Associate Professor Mardziah Hayati Bt. Abdullah, PhD

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This research looked at the use of a scaffolding-based software in helping learners to develop pronunciation and fluency modelled on standard American English. The study used Vygotsky's zone of proximal development (ZPD) theory and Scaffolding Learning Principles as a basis for observing how learners of English progressed through the learning process.

Firstly, the research examined an accent-reduction software to find out how the software design supports scaffolding principles. To determine the effectiveness of the software on learners' general pronunciation, pre-test and post-test were used. The data obtained from the pre-test and the post-test showed a significant improvement in learners' general pronunciation after using the pronunciation learning software.

Secondly, case studies were conducted to investigate Persian ESL learners' progress in pronouncing English consonants that are absent from the phonemic inventory of Persian. The selected cases were recorded during class time, while they were working with the software. The obtained recordings were then analysed using PRAAT, a speech analysis programme. Later, two raters helped the researcher to determine the quality of the sounds produced by the learners. The results from the case study showed that with the appropriate scaffolds provided by the software, in the form of explicit instruction, native models and multimodal feedback, the learners were found to have the microgenesis improvements towards the native model and progressed within the ZPD to pronounce the consonants that were absent from the inventory system of their first language.

Finally, learners' perceptions of the software were asked in an interview session after the instructional programme. Based on their responses to the interview questions, it was found that the learners positively perceived the use of the scaffolding-based accent reduction software to improve their general pronunciation.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan untuk ijazah Master Sastera

PENGGUNAAN PERISIAN BERASASKAN *SCAFFOLDING* DALAM PENINGKATAN SEBUTAN

Oleh

ANAHITA FARZANFAR

JANUARI 2008

Pengerusi: Profesor Madya Mardziah Hayati Bt. Abdullah, PhD

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Penyelidikan ini mentiliti penggunaan perisian yang berasaskan pirnsip *scaffolding* dalam membantu pelajar untuk memperbaiki sebutan bahasa Inggeris berdasarkan model sebutan Amerika. Dalam kajian ini, pemerhatian dibuat terhadap proses pembelajaran pelajar bahasa Inggeris berdasarkan teori *Zone of Proximal Development* dan prinsip *scaffolding* oleh Vygotsky.

Perisian *accent reduction* diteliti untuk mengenal pasti bagaimana perisian tersebut merangkumi prinsip *scaffolding*. Kemudian, prauji dan post-uji digunakan untuk memastikan keberkesanan perisian dalam memperbaiki sebutan pelajar secara keseluruhan. Data yang diperoleh dari ujian-ujian tersebut menunjukkan peningkatan yang signifikan.

Seterusnya, kajian kes dijalankan untuk meneliti proses pembelajaran yang dilalui oleh pelajar dalam usaha menghasilkan konsonan Inggeris yang tidak terdapat dalam bahasa ibunda mereka, iaitu Parsi. Beberapa subjek telah dipilih dan sebutan mereka dirakamkan semasa mereka menggunakan perisian itu. Rakaman itu kemudian telah dianalisis menggunakan PRAAT, iaitu program analisis penyebutan. Kualiti sebutan yang dirakam telah diteliti oleh penyelidik dan dua orang penilai. Dapatan kajian menunujukkan bahawa pelajar-pelajar telah mencapai peningkatan *microgenesis* dalam penyebutan konsonan sasaran dengan bantuan yang mencukupi daripada perisian. Bantuan tersebut adalah dalam bentuk pengajaran yang eksplisit, petutur bahasa Inggeris yang merupakan model, dan maklumbalas multimodal.

Akhirnya, temuduga telah dijalankan untuk memeroleh pendapat pelajar terhadap perisian ini. Berdasarkan respon mereka, didapati bahawa pelajar mempunyai persepsi yang positif terhadap penggunaan perisian berasaskan prinsip *scaffolding* untuk mempertingkatkan sebutan.

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Arts. The members of the Supervisory Committee were as follows:

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DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at UPM or at any other institutions.

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ANAHITA FARZANFAR

Date: 10 September

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LIST OF ABBREVIATIONS

ASR	Automatic Speech Recognition
EFL	English as a Foreign Language
ESL	English as a Second language
CALL	Computer-Assisted Language Learning
CAPL	Computer-Assisted Pronunciation Learning
CAPT	Computer-Assisted Pronunciation Training
SLA	Second Language Acquisition
ZPD	Zone of Proximal Development

CHAPTER 1

INTRODUCTION

This chapter introduces a background of the study in terms of computer and language development and language learning theories. Identification of existing problems in language learning is also has been discussed in this chapter. Based on the stated problem, the chapter introduces the objectives and research questions of the present study. Significance of the study also are presented later in Chapter 1 of the present thesis.

1.1 Background of the Study

The history of Computer-Assisted Language Learning (CALL) research dates back into the 1960s at academic institutions and to 1980s in schools in U.K and Europe (Levy, 1997). Since then, numerous studies across disciplines have been carried out to attempt to discover whether students with computers learned better and faster than students with traditional methods. According to the results of the previous studies, the effectiveness of CALL programmes has been proven, as a result of pedagogical and theoretical approaches applied in the design of the programme (Chamber, 2001).

The results of a study that was conducted by Riuz (2004) have shown that the three out of four commercial learning packages (i.e. 1- Interactive course of English Reward (1998), by Macmilian Heinemann ELT, Oxford; 2-Communucate and Connect (2001) by Syracuse; Interactive (2004) by Pearson-Longman Multimedia), did not meet any pedagogical requirements for an effective autonomous CALL programme.

The observation of Ruiz's study can answer some questions raised after doing research using CALL software, when no significant outcome was obtained by the end of the programme. For example, in a study by Stenson et al, (1992), no significant result was obtained by using the CALL software. In fact, the software with the mentioned characteristics was designed based on the approaches of traditional class rooms and the only difference was the embedding of the traditional approach in a new technology. It is expected that the CALL software be applicable in an autonomous situation to cover the shortcomings of traditional language classes.

To have an effective CALL environment, the software should provide the learner with the proper scaffolds to progress within the Zone of Proximal Development (see page 32, Section 2.2.3). Learners would receive the required assistance from the software and this provides learning autonomy while the learner is being helped by the software to shift from others-regulated task management to the self-regulated stage of learning, and finally to applying the new knowledge in a real life situation. Based on what is mentioned above, the current research is grounded on the integration of CALL and the scaffolding interpretation of socio-cultural learning theory (this approach will be discussed in detail in Chapter 2 of the present thesis) in pronunciation learning.

1.1.1 Computer and Language Development

Nowadays, the presence and availability of computers in everyday life encourage software designers to fulfil language requirements by developing language learning software. Language learning software is a combination of multimedia and artificial native speaker environments which have the potential to be used as successful language learning tools. They would be more advantageous in language learning process if the socio-cultural learning theories are also included.

In fact, the use of computers provides a number of advantages for language learning. Repeated exposure to the same material is beneficial or even essential to learning. In addition, a computer is ideal for carrying out repeated drills, since the machine does not get bored with presenting the same material. It can also provide immediate non-judgmental feedback. A computer can also present materials on an individualized basis, allowing students to proceed at their own pace, and freeing up class time for other activities. Listening can also be combined with seeing, just as in the real world. Multimedia and hypermedia technologies allow a variety of media (text, graphics, sound, animation, and video) to be accessed on a single machine (Warschauer et al., 1996).

Pronunciation work in particular can also benefit from multimedia. Recently, there has been a movement towards using technology in order to go beyond the limits of the classroom to give learners more autonomy and control in enhancing their English

language proficiency and accuracy (Anderson-Hsieh, 1990; Pennington, 1999). Computer-Assisted Pronunciation Training (CAPT) as the new technology in a pedagogical setting seems to offer a solution to the problem of the mentioned practical constraints. CAPT systems assist the learners to receive an unlimited input from the target language through different channels, to practise individually as often as they wish, and to enjoy unlimited patience from the tutor. The integration of Automatic Speech Recognition (ASR) technology also provides individualized feedback automatically and instantaneously for the learner (Pennington, 1999).

Most pronunciation programmes now incorporate some sort of voice recording and playback to let students compare their recordings with a model. Many of the English pronunciation programmes, such as *AccentMaster* programme from AccentMaster Company, *American Accent* Programme from Ford Language Institute, and *American Speech Sounds* from Speech Communication, have video clips and animations of the mouth making specific sounds. Some vocabulary programmes, such as *AccentMaster*, use speech recognition technology as well as graphical presentation of learners' speech as waveform demonstration and a native model-recorded template to help learners see how close they have come to the target pronunciation of presented segmental and suprasegmentals of the language. These visual cues work in conjunction with oral cues to provide sophisticated feedback and scaffold the learners in the acquisition of the desired pronunciation.

However, just like the traditional pronunciation training, Computer Assisted Pronunciation Training (CAPL) environments are only effective when they follow sound pedagogical guidelines and language learning theories. However, it appears that only a few of the available systems meet such requirements (Pennington, 1999). The problem with CAPT is worsened by the fact that some of the newest technologies employed within these systems are not perfect yet.

1.1.2 Language Learning Theories: Scaffolding

At the current stage, research in CALL has shifted from investigating whether CALL is superior to non-CALL, to how CALL can be used effectively in language learning (Chapelle, 2001). Few studies, however, have investigated how CALL software is designed according to principles of second language acquisition theory in an authentic setting. Chapelle (2001) points out that CALL research has tended to be conducted in laboratories. The theory of Socio-cultural language learning suggests that learners need to interact with the target language to acquire it (Larsen-Freeman and Long, 1991; Chapelle, 1998). Computer programmes that offer students the opportunities for interaction may scaffold learners begin to use the language effectively and draw closer to understanding how to use the language in actual environments (Harless et al., 1999).

Using CALL software which focuses on pronunciation and fluency has the potential to provide feedback that would otherwise be impossible. In traditional instructional settings, feedback and modelling are often provided by an instructor, who may or may not be good

at judging the students' pronunciation in the first place. The way of providing the feedback is often by either repeating the pronunciation or explaining how the sound should be produced, in a very abstract fashion. With the advancement of speech recognition technology, the student can receive the feedback in more effective ways (Dalby and Kewley-Port, 1999; Ehsani and Knodt, 1998; Eskenazi, 1999; Mostow and Aist, 1999).

The scaffolding approach has been known as an effective way in the language learning. It provides them the required assistance to get involved in their own learning process. Speech technology enriched by scaffolding patterns, comprising systems for analysing, recognising and synthesising speech, supports the process of acquiring skills in speaking the target language. While these techniques have been the subject of much published research (e.g. Eskenazi, 1999; Cucchiarini et al., 2000; Delmonte, 2000; Neumeyer et al., 1996; Minematsu, and Nakagawa (2000), little work has been done to assess the effectiveness of computer-assisted pronunciation training considering the learning theories to indicate the process of learners' improvement within the ZPD, to acquire the standard segmental and suprasegmental aspects of speech in target language. Thus, this study seeks to fill this gap.

Since CALL software may be used by learners outside a learning environment, with or without a language instructor, the presence of scaffolding structures in CALL software seems to be a necessity for the learners. These structures can assist the learners to follow

the programme independently while being scaffolded to progress within the ZPD to achieve the learning goal.

Thus, studying the use and efficacy of scaffolding based pronunciation learning software, and also detailed analysis of the learners' microgenesis progress within ZPD while working with the software, have been included in the current study to draw the quantitative and also qualitative perspectives of learners' movement in the ZPD using a scaffolded-based pronunciation and fluency learning software.

1.2 Problem Statement

Closer international relations, the use of satellite and the Internet as well as easier travelling abroad, have encouraged people to learn English as an international language, so learning of the English language has developed all over the world as an inevitable element for communication with the outside world.

In respect of the Interactist theories that are commonly used by the followers of Vygotsky's socio-cultural theory (Vygotsky, 1986) in the current fields of research on SLA, speaking is one of the main goals of language learning as it is necessary for successful communication. This theory maintains that true learning takes place through 'negotiation of meaning' (Pica, 1994; Lyster and Ranta, 1997). For the pronunciation aspect of the language, this means that misunderstanding the L2 speaker of the language as a result of mispronunciation of segments, lexical items or suprasegmentals, endangers the negotiation of meaning as a means for true learning.